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Stocking And Yield Of Virginia Pine Stands

In Prince Georges County, Maryland

Development of yield tables is prerequisite to designing forest-management plans. Yield tables have been prepared for Virginia pine in Maryland,¹ North Carolina,² and Pennsylvania.³ But the differences among yields in these three states are great. These differences are probably due chiefly to site. Therefore it would be desirable to have yield tables based on fairly local and uniform site conditions.

A study was made on the Beltsville Experimental Forest in Maryland to determine the average density and volume of local Virginia pine stands. Plots were established in stands ranging in age from 15 to 70 years. No age classes over 70 years were sampled because this age represents about biological maturity for Virginia pine. These stands were representative of Virginia pine stand conditions in Prince Georges County. On the average, 90 percent of the stems were Virginia pine; 9 percent were pitch, shortleaf, and loblolly pines; and 1 percent were hardwoods.

First measurements were taken on thirty 1/20-acre plots. Later observations were made on seven 1/2-acre plots within the same range of age classes. All trees 0.5 inch d.b.h. and larger were calipered and recorded by 1-inch d.b.h. classes.

¹Besley, Lowell. Yield tables for scrub pine (*Pinus virginiana*) in Maryland. (Unpublished thesis, Yale University School Forestry.) 1932.

²Slocum, G. K., and Miller, W. D. Virginia pine.. N. C. Agr. Expt. Sta. Tech. Bul. 100. 52 pp. 1952.

³McIntyre, A. C. Virginia pine in Pennsylvania. Pa. State Coll. Bul. 300. 31 pp. 1933.

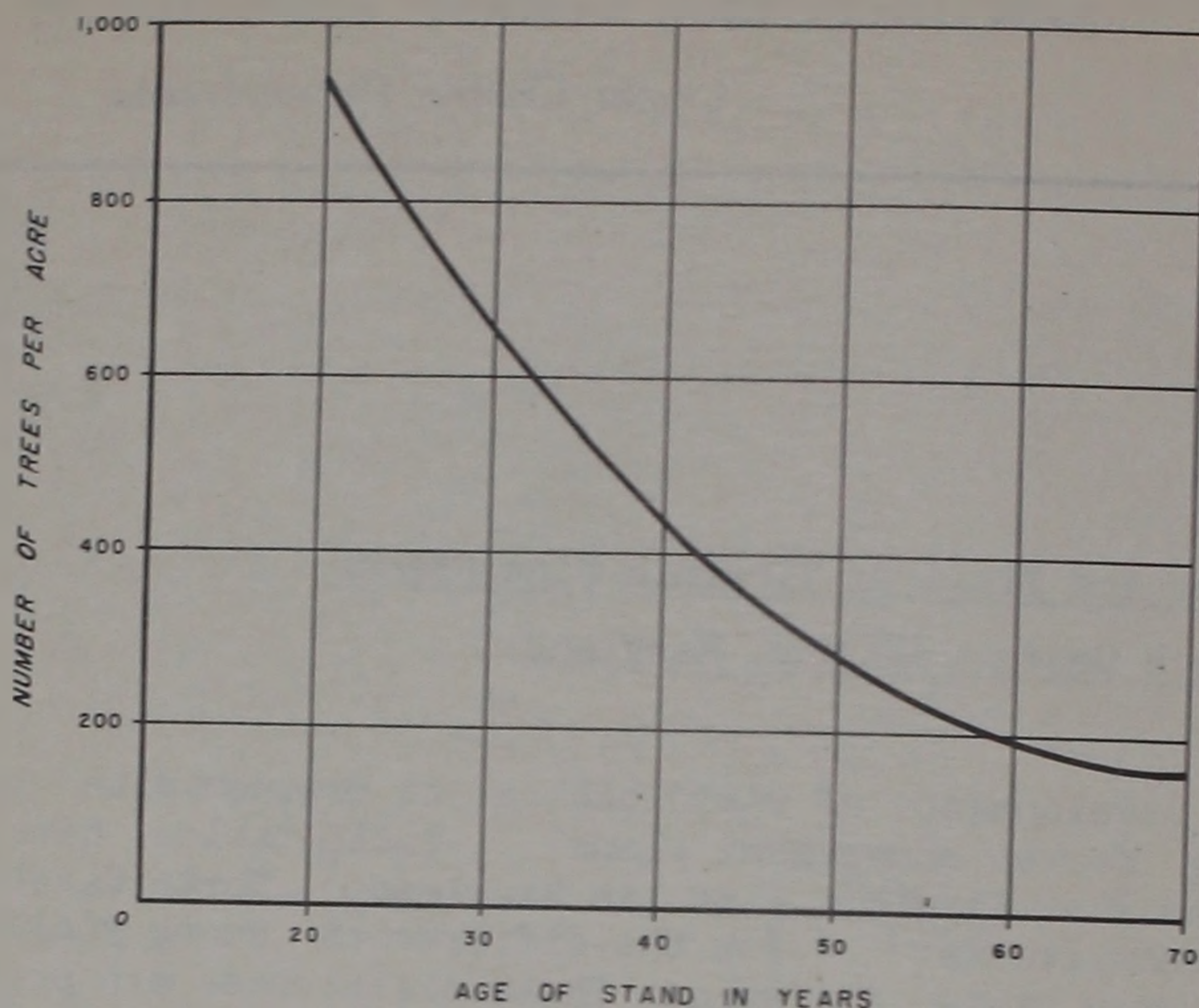


Figure 1.--Relationship between age of stand and number of trees per acre, for Virginia pine in Prince Georges County, Maryland.

The data from these measurements were subjected to regression analysis based on stems per acre by age of stand. Data from 1/20-acre plots and data from 1/2-acre plots had similar regression curves. The number of stems per acre by age of stand is shown in figure 1. This curve was drawn from the regression equation

$$Y = 1691.67 - 44.26X + 0.3212X^2$$

in which Y equals the number of stems per acre and X equals the age of the stand.

The original stand tallies on the 1/2-acre plots were used to get the percentage distribution of size classes by age of stand. These data were curved by 1-inch d.b.h. classes. Values were then taken from the curves at 10-year intervals, starting at age 20. These percentage values were applied to the regression equation to obtain number of trees per acre by age and diameter class (table 1). The standard error of estimate for the regression is 186.

Average yields for Virginia pine stands of different ages (table 2) were obtained by applying a local volume

Table 1.--Size and age-class distribution in Virginia pine stands in Prince Georges County, Maryland

(Number of trees per acre)

D.b.h. (inches)	Age class, in years					
	20	30	40	50	60	70
1-4	561	202	52	8	--	--
5	187	124	74	34	12	--
6	103	111	74	39	17	5
7	56	98	70	40	17	7
8	28	65	61	37	17	12
9	--	26	43	36	23	19
10	--	20	35	34	31	30
11	--	7	22	28	23	23
12	--	--	4	14	17	20
13	--	--	--	9	13	17
14	--	--	--	3	10	13
15	--	--	--	--	6	10
16	--	--	--	--	4	8
17	--	--	--	--	2	3
Total	935	653	435	282	192	167

Table 2.--Average yields of pure Virginia pine stands in Prince Georges County, Maryland

Age of stand (years)	Volume per acre*
	<u>Cubic feet</u>
20	1,276
30	2,437
40	2,800
50	2,846
60	3,089
70	3,542

*Merchantable volume of solid wood in trees 5 inches d.b.h. and larger, taken to a 4-inch top.

table⁴ to the stand data listed in table 1. The volumes represent solid wood contents of all trees over 4.5 inches d.b.h., taken to a 4-inch top. Variations in stocking density are greatest in the younger age classes. But volume differences due to variations in stocking would be greater in the older age classes.

The low periodic increment between 40 and 50 years is due to stand adjustment during this period. Virginia pine stands suffer the greatest losses in merchantable-sized trees between these ages. After 50 years fewer trees die and increment is concentrated on larger stems.

The values shown in tables 1 and 2 are somewhat less than those Besley listed for Maryland. They are considerably lower than the stocking densities and volume yields Slocum and Miller reported in North Carolina. And the yield tables developed by McIntyre show the stocking of Virginia pine to be higher in Pennsylvania than in Prince Georges County, Maryland. However, the volume yields for Pennsylvania stands are much lower than those found in this study.

Since the number of samples used in this study was small, the values obtained are subject to rather large sampling errors. Please bear this in mind when you use these

⁴Church, Thomas W., Jr. A volume table for Virginia pine in Prince Georges County, Maryland. Northeast. Forest Expt. Sta. Forest Res. Note 22. 3 pp. 1953.

tables, for the volumes they give may not agree with the volumes you find. The differences will probably be due to differences in stand density. Periodic increment may be less variable.

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